

# Grain Size Scales and Conversion Tables

The grade scale most commonly used for sediments is the Wentworth (1922) scale which is a logarithmic scale in that each grade limit is twice as large as the next smaller grade limit. The scale starting at 1mm and changing by a fixed ratio of 2 was introduced by J. A. Udden (1898), who also named the sand grades we use today. However, Udden drew the gravel/sand boundary at 1mm and used different terms in the gravel and mud divisions. For more detailed work, sieves have been constructed at intervals  $2^2$  and  $4^2$ . The  $\phi$  (phi) scale, devised by Krumbein, is a much more convenient way of presenting data than if the values are expressed in millimeters, and is used almost entirely in recent work.

U. S. Standard Sieve Mesh #	Millimeters (1 Kilometer)	Microns	Phi ( $\phi$ )	Wentworth Size Class	
			-20		
	4096		-12		
	1024		-10	Boulder (-8 to -12 $\phi$ )	
Use _____	256		-8		
wire _____	64		-6	Cobble (-6 to -8 $\phi$ )	
squares _____	16		-4	Pebble (-2 to -6 $\phi$ )	
5 _____	4		-2		
6 _____	3.36		-1.75		
7 _____	2.83		-1.5	Granule	
8 _____	2.38		-1.25		
10 _____	2.00		-1.0		
12 _____	1.68		-0.75		
14 _____	1.41		-0.5	Very coarse sand	
16 _____	1.19		-0.25		
18 _____	1.00		0.0		
20 _____	0.84		0.25		
25 _____	0.71		0.5	Coarse sand	
30 _____	0.59		0.75		
35 _____ 1/2 _____	0.50	500	1.0		
40 _____	0.42	420	1.25		
45 _____	0.35	350	1.5	Medium sand	
50 _____	0.30	300	1.75		
60 _____ 1/4 _____	0.25	250	2.0		
70 _____	0.210	210	2.25		
80 _____	0.177	177	2.5	Fine sand	
100 _____	0.149	149	2.75		
120 _____ 1/8 _____	0.125	125	3.0		
140 _____	0.105	105	3.25		
170 _____	0.088	88	3.5	Very fine sand	
200 _____	0.074	74	3.75		
230 _____ 1/16 _____	0.0625	62.5	4.0		
270 _____	0.053	53	4.25		
325 _____	0.044	44	4.5	Coarse silt	
	0.037	37	4.75		
_____ 1/32 _____	0.031	31	5.0		
Analyzed _____ 1/64 _____	0.0156	15.6	6.0	Medium silt	
	0.0078	7.8	7.0	Fine silt	
by _____ 1/256 _____	0.0039	3.9	8.0	Very fine silt	
	0.0020	2.0	9.0		
Pipette _____	0.00098	0.98	10.0	Clay	
	0.00049	0.49	11.0	(Some use 2 $\phi$ or	
or _____	0.00024	0.24	12.0	9 $\phi$ as the clay	
	0.00012	0.12	13.0	boundry)	
Hydrometer _____	0.00006	0.06	14.0		

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